

## BUTTERFLIES AND SKIPPERS

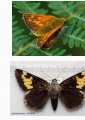
### Introduction and Overview



## Classification (old)

### Hesperioidea (skippers)

Hesperiidae  
Megathymidae



### Papilionoidea (true butterflies)

Papilionidae  
Pieridae  
Nymphalidae (Danainae, Satyrinae, Heliconiinae)  
Libytheidae  
Lycaenidae  
Riodinidae

Papilionidae  
swallowtails



Pieridae  
whites and sulphurs



Nymphalidae  
brush-footed  
butterflies



Libytheidae  
snout butterflies



Lycaenidae  
blues, coppers  
and hairstreaks



Riodinidae  
metalmarks



## Classification (1990s)

Hesperioidea (skippers)  
Hesperiidae  
Megathymidae



swallowtails



whites and sulphurs



Papilionoidea (true butterflies)  
Papilionidae  
Pieridae  
Nymphalidae (Danainae, Satyrinae, Heliconiinae)  
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Riodinidae



brush-footed  
butterflies



snout butterflies



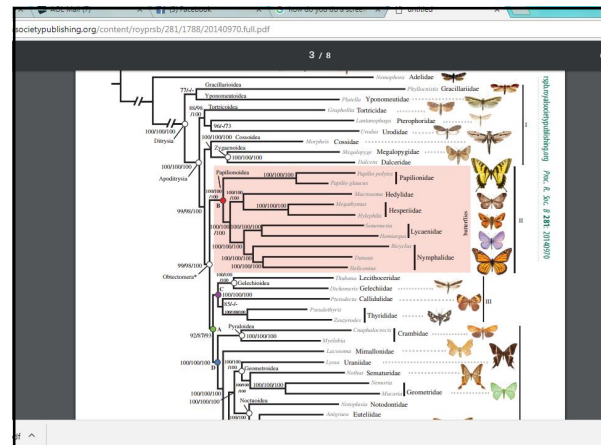
Hedyoidea  
Hedylidae  
(Soble, 1986)



blues, coppers  
and hairstreaks



metalmarks



## Classification (Nieukerken et al. 2011)

Superfamily **Papilionoidea** Latreille, 1802 (7 families, 18,768 spp.)

Family **Papilionidae** Latreille, 1802 (32 genera, 570 species)  
Family **Hedylidae** Guenée, 1858 (1 genus, 36 species)  
Family **Hesperiidae** Latreille, 1809 (570 genera, 4,113 species)  
Family **Pieridae** Swainson, 1820 (91 genera, 1,164 species)  
Family **Riodinidae** Grote, 1895 (146 genera, 1,532 species)  
Family **Lycaenidae** Leach, 1815 (416 genera, 5,201 species)  
Family **Nymphalidae** Rafinesque, 1815 (559 genera, 6,152 species)

Current placement and composition of "butterflies" (including Hesperiidae and Hedylidae) is strongly supported by two large molecular studies (Regier et al. 2009; Mutanen et al. 2010).

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### Papilionidae (adults)

**SWALLOWTAILS AND PARNASSIANS**





Swallowtails large with slender body, usually with hindwing tail-like projection.

Parnassians mostly white, with areas lacking scales (translucent).

[clubbed antennae; amplexiform wing coupling]



NOT!  
Frenate wing coupling  
Antennae without club

### Troidini – *Aristolochia* feeders

12 genera, 135 species






### Papilionidae (early stages)

**SWALLOWTAILS AND PARNASSIANS**

External foliage feeders.

Swallowtail larvae without secondary setae (naked).

Parnassian larvae covered with fine setae.

Larval head of all papilionids with osmeteria.





### Papilionidae (early stages)

**SWALLOWTAILS AND PARNASSIANS**



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Swallowtail larvae without secondary setae (naked).

Parnassian larvae covered with fine setae.



Larval head of all papilionids with osmeteria.

Pupa with cremaster and silken girdle.

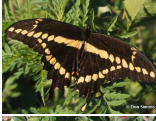





### Some Common Papilionidae of Southern Arizona



*Battus philenor*  
Pipevine swallowtail

*Papilio cresphontes*  
Giant swallowtail

*Papilio multicaudata*  
Two-tailed swallowtail

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## Hedylidae (adults)

### HEDYLIDS

Frenate wing coupling.  
Filiform antennae.  
Mostly nocturnal.  
Geometrid-like wing shape.  
Lack tympanum.



## Hedylidae (early stages)

### HEDYLIDS

Larvae nymphalid-like.  
Pupae pierid-like.

Scoble, M. J. 1986. The structure and affinities of the Hedyloidea: a new concept of the butterflies. *Bulletin of the British Museum (Natural History) (Entomology)* 53: 251-286.

Kendall, R. O. 1976. Larval food plants and life history notes for eight moths from Texas and Mexico, *Journal of the Lepidopterists' Society* 30: 264-271.

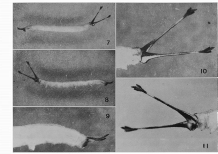


Fig. 7-11. *Hedyle fulvicornis*: 7, 1st instar larva, dorsal view; 8, pupa, lateral view; 9, pupa, ventral view; 10, 2nd instar larva, dorsal view; 11, 3rd instar larva, lateral view.

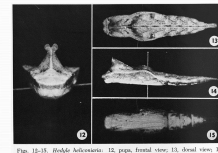


Fig. 12-15. *Hedyle fulvicornis*: 12, pupa, frontal view; 13, dorsal view; 14, lateral view; 15, ventral view.

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## Hesperiidae (adults)

### SKIPPERS

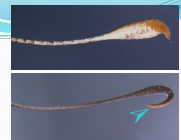
Body usually short, stout (often extending posterad beyond wings).

Antennae with apiculus.

Characteristic resting postures.

Wings usually orange and/or brown.

Rapid flyers.



## Hesperiidae (early stages)

### SKIPPERS

External foliage feeders, but usually construct a shelter made from leaves of host plant (Poaceae for many/most Hesperinae; gobs of families for Pyrginae; yucca and agave for Megathyminae).

Large head with conspicuous constriction posteriorly.

Pupae usually with a cremaster and often a silken girdle.



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## Pieridae (adults)

WHITES, SULPHURS, ORANGE-TIPS

Medium-sized (one small exception).  
Body usually moderately slender.  
Distinctive forewing colors/patterns.



*Anthocharis cethura pima*



## Pieridae (early stages)

WHITES, SULPHURS, ORANGE-TIPS

External foliage feeders.

Larvae typically with numerous annulations (sub-segments) per segment.

Pupa with cremaster and silken girdle.

Pierinae usually on Brassicaceae.

Colidinae usually on Fabaceae.



## Some Common Pieridae of Southern Arizona



*Pieris protodice*



*Nathalis iole*



*Colias eurytheme*



*Phoebis sennae*



*Eurema nicippe*



*Eurema mexicana*

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## Riodinidae (adults)

METALMARKS

Usually small-sized with slender body.  
Eyes emarginate at base of antenna.

Male with foreleg coxa extending below trochanter.



eye emarginate at antenna

foreleg coxa



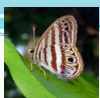
*Apodemia mormo*



*Calephelis*



*Emesis*



## Riodinidae (early stages)

METALMARKS

External feeders in foliage and flowers.

Larvae with conspicuous secondary setae, often long and hairy.

Pupa short, rounded, covered with fine hairs, attached to substrate by cremaster and silken girdle.

Many tended by ants.



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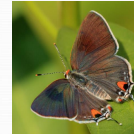
## Lycaenidae (adults)

BLUES, COPPERS, AND HAIRSTREAKS

Usually small-sized with slender body.

Eyes emarginate at base of antenna.

(hmmm, sounds like Riodinidae?)



## Lycaenidae (early stages)

BLUES, COPPERS, AND HAIRSTREAKS

External feeders mostly in flowers and fruit.

Larvae typically slug like, with head retracted.

Pupa with cremaster and silken girdle.

Some species tended by ants.



Fig. 3. First instar larva of *Lycaenidae* with predominantly reddish color.

## Some Common Lycaenidae of Southern Arizona



*Leptotes marina*



*Hemiargus ceraunus*



*Hemiargus isola*



*Brephidium exile*



*Strymon melinus*



*Callophrys grynea*



*Hypaurotis crysalis*

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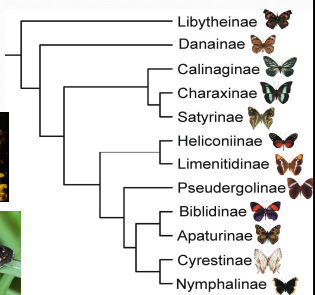
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## Nymphalidae (adults)

BRUSH-FOOTED BUTTERFLIES,  
ADMIRALS, CRESCENTS, SILVERSPOTS

Small to large butterflies.

Forelegs reduced and brush-like.



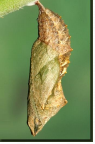
### Nymphalidae (early stages)

BRUSH-FOOTED BUTTERFLIES,  
ADMIRALS, CRESCENTS, SILVERSPOTS

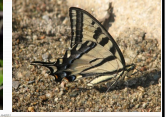
External feeders in foliage.

Larvae typically with dense secondary setae,  
but variable by subfamily.

Pupa with cremaster, often without silken  
girdle.



### Name that family



What's the difference between a  
butterfly and a moth?